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सिंचाई जल के लिए दर नियत करने के मार्गदर्शी सिद्धान्त

Indian Standard

GUIDELINES FOR FIXING RATES FOR IRRIGATION WATER

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Water Resources, Planning, Management and Evaluation Sectional Committee, RVD 6

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Water Resources, Planning, Management and Evaluation Sectional Committee had been approved by the River Valley Division Council.

'Water rates, as well as the principles adopted to fix them' vary from State to State. The systems of levying water rates have been influenced by local conditions and irrigation practices.

India adopted a National Water Policy in 1987, which lays down the following guidelines for fixing the water rates:

'Water rates should be such as to convey the scarcity value of the resource to the users and to foster the motivation for economy in water use. They should be adequate to cover the maintenance and operation charges and a part of the fixed costs. Efforts should be made to reach this ideal over a period while ensuring the assured and timely supplies of irrigation water. Water rates for surface water and ground water should be rationalized with due regard to the interests of small and marginal farmers'.

The guidelines for fixing irrigation water rates, laid down in this Indian Standard are based on the recommendations of the following commissions and the National Water Policy, 1987:

a) Maharashtra State Irrigation Commission 1962,
b) Irrigation Commission 1972,
c) National Commission on Agriculture 1976,
d) 10th Finance Commission 1994, and
e) Vaidyanathan Committee Report 1992.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

GUIDELINES FOR FIXING RATES FOR IRRIGATION WATER

1 SCOPE

This standard lays down the guidelines for fixing rates for irrigation water.

2 PRINCIPLES

2.0 The following principles should be kept in view while fixing the rates for irrigation water.

2.1 Water rates should be adequate to cover the annual maintenance and operation charges and a part of the fixed costs. Efforts should be made to reach this ideal over a period.

2.2 Water rates should be generally levied on 'crop basis' except in the cases of irrigation from tubewells and to Water Users' Associations.

2.3 The crop water rate should be related to the gross income from the crop. It should range between 5 percent and 12 percent of the gross income. (The lower limit being applicable to food and fodder crops and the upper limit to cash crops.)

2.4 For fixing rates, irrigation should be divided into categories A, B and C depending on the quality of service, that is, on the basis of quantity and timeliness of supply. Lower rates may be fixed where on account of good rainfall, the demand for irrigation water is less or where the supply is inadequate and uncertain.

2.5 The rates should be uniform for same class of supply over a State or a region and the disparity in rates for same class of supply between the regions, if any, should be minimum.

2.6 Where lift irrigation is done at farmers' cost, water is generally used economically and wastage is reduced. The resulting saving in water justifies a lower water rate.

2.7 Water rates should be revised after every five years.

2.8 While promotional water rates may be necessary on projects where cultivators are not familiar with irrigated agriculture and the demand for water is not keen, prolonged concessions are undesirable as they entail loss of revenue and accustom the irrigators to low rates and it becomes difficult to raise as time passes. In areas where cultivators are keen on irrigation, promotional rates may not be necessary.

3 PROCEDURE FOR ESTIMATING WATER RATES

3.1 As stated in **2.1** water rates should be adequate to cover the annual maintenance and operation charges and a part of the fixed costs. These costs comprise the following items:

1) *Variable Costs:*
    a) Establishment charges;
        i) Regular, and
        ii) Work-charged.
    b) Maintenance of work charges; and
    c) Energy charges (in the case of Government Tubewells and Lift Irrigation Schemes).
2) *Fixed Costs:*
    a) Interest on capital cost, and
    b) Depreciation.

3.2 As stated in **2.5** water rates should not vary from project to project in a State and normally should be same throughout for same quality or service. Hence the average cost per unit of water, that is, the total amount of the variable and fixed costs, per unit of water in respect of each class of irrigation projects in a state or region for three years immediately preceding the last year or the current block period of 5 years, should be worked out. Quantum of water to be considered would be the annual utilization on each project. Interest on capital cost is to be taken at 10 percent per annum. The life of major and medium irrigation projects is generally assumed as 100 years and of minor irrigation projects as 50 years. Hence the depreciation for major and medium irrigation projects would be 1.00 percent and for minor irrigation project 2 percent of capital cost. For lift irrigation schemes, the life of civil works is considered as 25 years and that of pumping machinery and ancillaries as 12 years. The depreciation should therefore be taken as 4 percent of the capital cost of civil works and 8.33 percent of the capital cost of pumping machinery.

3.3 The cost per unit of water for the first year and the fifth year of the next block period of 5 years should then be worked out by applying escalation at the rate of 5 percent per annum to the variable costs. The average of these two values would give the cost per unit of water for the next block period of 5 years.

3.4 The rate of evaporation increases in summer season thereby causing more loss of water during the summer season. It is, therefore, necessary to account for this increase in loss by proportionately increasing the cost of water to be used during the summer season. The cost per unit of water should be increased considering the higher ratio of evaporation during summer season.

3.5 Where the water rates are to be levied on 'Crop basis', the requirement of water for each crop has to be worked out. The water requirement of a crop is determined by evapotranspiration, which is primarily governed by meteorological factors. There are number of climatological methods to estimate the cropwater requirements, out of which the Modified Penman Method is widely used. The water requirement at canal head should then be arrived at by dividing the water requirement at field, estimated by the climatological methods, by the overall irrigation efficiency obtaining on the projects in the state or region.

3.6 From the water requirement thus worked out and taking into consideration the season and the cost per unit of water, as assessed above, the water rate per hectare of a crop should be arrived at.

3.7 As stated in **2.3**, the water rate should also be related to the gross income of the crop and should be within the range of 5 percent and 12 percent of the gross income. Gross income from various crops of a state or region for the three years of the current block period of 5 years, considered for working out the cost per unit of water in **3.2**, should be obtained from the Agriculture Department of the State and the average gross income should be found out. Then the gross income for the first year and fifth year of the next block period should be estimated with 3 percent annual escalation and the average of these two values would give the gross income from the crop for the next block period.

3.8 The water rates for different crops as worked out in **3.1** and **3.7**, should be compared. The component of fixed costs in the water rates, as worked out in **3.1**, is variable as the National Water Policy lays down that the water rate should cover only a part of the fixed costs. Hence the water rate for each crop should be so fixed, by varying the fixed costs, that it (water rate) would be within the range of 5 percent and 12 percent of the gross income from that crop. The water rate thus arrived at should again be examined considering the paying capacity of irrigators and should aim at ensuring full utilization of available supplies.

4 CLASSIFICATION OF SOURCE OF SUPPLY

4.1 Irrigation water is generally available from the following sources:

a) By flow from canals of irrigation projects,
b) By lift from reservoirs of irrigation projects,
c) By lift from canals of irrigation projects,
d) By lift from rivers supported by reservoirs upstream of irrigation projects,
e) By lift from rivers without any support by reservoirs upstream,
f) By lift from wells within a short distance of any of (a) to (e) above,
g) By lift from return flow of irrigation, and
h) By lift downstream of the pickup weir and where there is no backwater of any storage further downstream.

4.2 Irrigation projects are designated as major, medium and minor on the basis of culturable command areas (CCA) as below:

a) Major Project: CCA > 10 000 Ha.
b) Medium Project: 10 000 Ha > CCA > 2 000 Ha.
c) Minor Project: CCA < 2 000 Ha.

4.3 It is necessary to classify the sources as A, B and C to describe the quantum, reliability and timeliness of supply. The dependability of water availability is an important parameter for classification of quality of service. Generally Major projects and perennial rivers have a 75 percent dependability. Some of the Medium and Minor Irrigation projects can also be of more than 75 percent dependability, depending upon the nature and climate in the catchment area. Even though the yield from a catchment is variable, dependability can be increased by having a larger capacity in the reservoir and thereby providing a carry over from a good year to a bad year. On the other hand, where no carry over storage is provided and a large quantity of water is allocated for drinking water or industries, on a more than 75 percent dependability, the availability for irrigation may become less than 75 percent dependable.

Quality of service also includes quantum and timeliness. A reservoir source, for example, is more reliable than a canal source wherein the timeliness of water supply depends on the canal management authority. Similarly if there is lift irrigation a stretch of river between a reservoir and a weir from where its canals take off it will enjoy a better quality of service.

4.4 The sources of water supply can, therefore, be classified as class A, B or C in the following manner:

Class A

a) Reservoirs of more than 75 percent dependability — Reservoir lift, and river stretches between reservoir and pickup weir. River lifts supported by such reservoirs. Wells within recharge distance from such systems.

b) Perennial rivers of adequate flow.
c) Return flow on such systems.

Class B

a) Reservoirs of more than 75 percent dependability—Canals and canal lifts.
b) Reservoirs of dependability 50 percent or more but less than 75 percent—Reservoir lifts, river stretches between reservoir and pickup weir. River lifts supported by such reservoirs. Wells within recharge distance of these systems.
c) Perennial rivers of 50 percent dependable flow.
d) Return flow on (b) above.

Class C

Other than A and B above.

If there are any large competing demands for non-irrigation purposes, this factor should be weighed in classification.

4.5 The basic water rates for irrigation projects should be worked out as explained in **3** and should apply to appropriate category. The basic water rates for Class B and Class C category of projects may be reduced to about 75 percent and 50 percent. The basic water rates for A category, will remain the same.

5 RATES FOR FLOW IRRIGATION

5.1 For flow irrigation from canals, where the irrigator is not expected to make any investment for taking the water to his field, these basic rates may be applied.

5.2 For flow irrigation from canals, where the irrigator is expected to contribute for the construction of field channels, these basic rates may be reduced by 10 percent.

6 LIFT IRRIGATION SCHEMES

6.1 There are two types of Lift Irrigation Schemes, namely, (a) Co-operative or private, and (b) Government owned.

6.1.1 *Co-operative or Private Lift Irrigation Schemes*

On such Lift Irrigation Schemes, the distribution system of project is not used. On the other hand the farmers have to invest for pumping the further distribution of water. Also the energy charges are to be borne by the irrigators. The water rates for such lift irrigation schemes should, therefore, be arrived at by reducing the basic rates by 25 percent.

For Lift Irrigation Schemes on Canal, the reduction may be only 10 percent instead of 25 percent.

Where, the Lift Irrigation Schemes lift water from rivers and the Government has not incurred any expenditure on diversion or storage of water, royalty charges, as decided by the state may be levied.

6.1.2 *Government Owned and Operated Lift Irrigation Schemes*

On such irrigation schemes, the water rates will have to include:

a) rates for water, depending on the location of the point of lifting as explained in **6.1.1**; and
b) Cost of lifting and further distribution.

This should be estimated as outlined in **3**. For this purpose the lift Irrigation Schemes may be suitably grouped on the basis of total lift involved. Thus the rates as calculated in **6.1** will be enhanced to account for the charges on account of lifting—both operating charges and fixed costs.

6.2 Where Government takes up Lift Irrigation Schemes to irrigate areas which cannot otherwise be covered by flow irrigation and where otherwise the water cannot be harnessed for irrigation, the rates should be the same as for flow irrigation as in **5**. Large lift irrigation projects covering more than 10 000 Ha of command will be included in this category.

7 TUBEWELLS

7.1 The tube well water should be charged on the basis of the quantity of water supplied at the tubewells. There would be some disparity in the amount which irrigators pay for areas located at different distances from the tubewell because of the transit losses but with lined water courses and a proper roster of supply, the disparity can be considerably reduced.

7.2 The rate per unit of water should be worked out as explained in **3**. Tubewells can be classified in Class A category.

8 WATER RATES FOR VOLUMETRIC SUPPLY OF WATER TO WATER USER'S ASSOCIATIONS (WUA)

8.1 It is now an accepted fact that for achieving economic use of water, the supply of water should be on volumetric basis. However, since it is not practicable to measure water supplied to individual farmers because the average farm holding is very small, the formation of Water Users' Associations (WUA) in the form of co-operative societies of farmers, in the command of minors is being encouraged. The Water Users' Associations should be supplied water at the head of minor or a small distributary on volumetric basis.

8.2 As the basis for arriving at water rates is not only the unit operating cost of water but also the value of the crop, the rate for volumetric supply will turn out to be different for different crops. As the supply is made to a WUA, distinction on the basis of crops grown will have to be removed. Actual cropping pattern obtaining in command areas of different regions should be taken as the basis. Based thereon different water rates for different seasons may be arrived at per unit of water.

8.3 To cover the costs of management and as an incentive to the Water Users' Associations the water rates for bulk supplies on volumetric basis may be fixed at 80 percent of the corresponding rate arrived at, on crop-basis.

9 PROMOTIONAL WATER RATES

On the commencement of new irrigation projects, the supplies in the initial years are not quite satisfactory. Most of the farmers are also new to irrigated agriculture. The farmers are also required to mobilise resources, necessary for irrigated farming. Hence in the initial years it is desirable to charge concessional rates, and then raise them gradually to full rates.